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Exploring lived heat, "temperature work" and embodiment: novel auto/ethnographic insights from physical cultures



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Abstract

Drawing on sociological and anthropological theorizations of the senses and “sensory work”, the purpose of this article is to investigate via phenomenology-based auto/ethnography, and to generate novel insights into the under-researched sense of thermoception, as the lived sense of temperature. Based on four long-term, in-depth auto/ethnographic research projects, we examine whether thermoception can be conceptualized as a distinct sense or is more appropriately categorised as a specific modality of touch. Empirically and analytically to highlight the salience of thermoception in everyday life, we draw on findings from four auto/ethnographic projects conducted by the authors as long-standing insider members of their various physical-cultural lifeworlds. The foci of the research projects span the physical cultures of distance running, mixed martial arts, traditionalist Chinese martial arts, and boxing. Whilst situated within distinctive physical-cultural frameworks, nevertheless, the commonalities in the thermoceptive elements of our respective experiences as practitioners were striking, and thermoception emerged as highly salient across all four lifeworlds. Our analysis explores the key auto/ethnographic findings, centring on four specific areas: elemental touch, heat of the action, standing still, and tuning in. Emerging from all four studies were key findings relating to the valorization of sweat, and the importance of “temperature work” involving thermoceptive somatic learning, and physical-culturally specific bodily ways of knowing and sense-making. These in turn shape how heat and cold are actually “felt” and experienced in the mind-body.

Introduction

Despite a developing ethnographic research literature on particular sports and physical cultures, including a small but growing literature on the sensory dimension of physical cultures (Hockey 2005a, Hockey and Allen-Collinson 2009, Sparkes 2009, Allen-Collinson and Hockey 2011, Allen-Collinson and Owton 2014, Allen-Collinson and Leledaki 2015), to date these studies have devoted little analytic attention to examining thermoception, the sense of temperature (Allen-Collinson and Owton 2015). This is perhaps surprising, given the importance of thermoception and thermoregulation within physical cultures. In anthropological research, however, thermoception¹, has proved a topic of some interest, particularly with regard to culturally-specific ways of “living”, experiencing and conceptualising heat (see for example, Ong 2012). Here, we combine insights from anthropology with sociological theorizations of the senses and “sensory work” (sense-making activity in relation to the senses) to investigate whether thermoception can be conceptualized as a distinct sense or is more appropriately categorised as a specific modality of touch. In this case, we are interested in the interpretations, meanings and understandings surrounding the sense of thermoception, experienced as lived heat/cold (Allen-Collinson and Hockey 2011, Throsby 2013, Vannini and Taggart 2014, Allen-Collinson and Owton 2015), which we term “temperature work”. We have specifically chosen to focus on a range of physical cultures in which we are involved in everyday life, as these exemplify well the importance of temperature work. Our physical-cultural auto/ethnographic focus here spans distance-running, mixed martial arts (MMA), traditionalist² Chinese martial arts (TCMA), and boxing. We could have chosen to explore occupational or domestic worlds (see Vannini and Taggart 2014), but our data revealed insights into unusual aspects of temperature as contoured by and lived within these physical cultures. Whilst acknowledging the specificities of these cultures, it is the shared thermoceptive elements and understandings upon which we

¹ Sometimes termed ‘thermoreception’

² We employ this term, as there are ongoing debates about the modern ‘invention’ of these Chinese martial arts.

focus our analytic attention for the purpose of this particular article, drawing upon forms of phenomenologically-based auto/ethnography (for discussions of phenomenologically-based *ethnography*, see vom Lehn and Hitzler 2015, Honer and Hitzler 2015 in this journal).

The relative paucity of sociological research on the lived experience of heat is perhaps surprising, given the importance of thermoception, and also of thermoregulation (bodily efforts to regulate temperature) within everyday life, including in sports and physical cultures. So important are thermoception and thermoregulation generally that humans, analogous to other animals, die relatively rapidly without a sense of heat (Vannini and Taggart 2014, Allen-Collinson and Owton 2015). In recent years, the importance of thermoception and thermoregulation has been highlighted in the media where deaths from hyperthermia (so called heat exhaustion or heat stroke) have featured, including deaths of highly physically-fit young adults undergoing military training in the UK's Brecon Beacons (Farmer 2013). Heat is the leading weather-related killer in the United States, even though most heat-related deaths are preventable through intervention (Environmental Protection Agency 2014). Temperature work is thus of great importance in human survival, and therefore a pertinent area of sociological and anthropological enquiry.

Building on a small literature addressing the sense of heat/cold in physical cultures such as dance (Potter 2008), marathon swimming (Throsby 2013), swimming (Hockey and Allen-Collinson 2016), diving (Allen-Collinson and Hockey 2011), and boxing (Allen-Collinson and Owton 2015), here we examine the lived sense of heat within four different physical cultures. We draw on the authors' own individual auto/ethnographic projects undertaken as "complete member researchers" (Adler and Adler 1987) within the physical-cultural domains studied. We are particularly interested in exploring some of the complex and rich sensuousities of "intense embodiment" (Allen-Collinson and Owton 2015) experiences of heat and cold, as perceived both within and at the boundaries of the body. In addressing the relative research lacuna vis-à-vis qualitative sociological research into the lived experience of heat/cold, we are concerned with investigating claims that the sense of heat can be conceptualised as a sense *per se*, a distinctive

sensory mode analogous to other of the “classic five” Romano-Grecian senses of sight, sound, smell, touch, and taste.

A small number of sociologists and anthropologists are amongst those who argue that temperature can be perceptually experienced and analytically conceptualised as a distinct sensory modality (e.g. Potter 2008, Allen-Collinson and Hockey 2011, Ong 2012, Vannini and Taggart 2014); a boundary-crossing sense operating at various dermal levels, and also interoceptively “felt”, sometimes as a sense of inner energy and life-force. Other perspectives portray temperature perception as a particular form of touch (see Throsby 2013, Allen-Collinson and Owton 2015). In the findings section below, we explore both these perceptual frameworks in relation to our chosen physical-cultural training practices. “Felt” temperature within injury experiences is also explored, given that injury all too often constitutes an integral, if unwelcome, component of physical-cultural activity. In terms of structure, we commence with a brief overview of the theoretical and methodological framework of phenomenological sociology, and then portray the four phenomenologically-based auto/ethnographic projects from which the data are drawn. Framed by theoretical and conceptual constructs germane to the sociology of the senses, and drawing on these data, we examine how thermoception emerged as a key modality within each of our physical-cultural ethnographic worlds.

Phenomenological sociology

In introducing our theoretical and methodological perspective, we note that “modern” phenomenology comprises a complex amalgam of different strands (see Allen-Collinson 2009), but in general focuses on the investigation of *phenomena* (from the Greek *phainomenon*): things that appear to consciousness; the structures and objects of consciousness. Phenomenologists seek to identify the “essences”, or core characteristic structures of a phenomenon, by employing the phenomenological “method” or perspective; an encompassing way of perceiving and comprehending the world. This involves two key components: first, the researcher’s engagement in the phenomenological *epochē*, requiring best efforts to suspend the “natural attitude” - our everyday ways of thinking. We seek to identify and question taken-for-granted ideas,

assumptions and presuppositions veiling a phenomenon, to examine and reflect upon its core elements. As Overgaard (2010, 180) summarises, phenomenological descriptions “quote” the experiences being reflected upon, identifying how things are “according to the experience”. A second stage is the phenomenological *reduction*, involving attempts to arrive at the *eidos* of a phenomenon, to reduce it to its essential forms or characteristics, without which it would cease to be the phenomenon under investigation (see Allen-Collinson 2009, 2011), at least for the social group being studied. Here, the process of “free imaginative variation” may be brought into play (as we have done in some of the projects described below) when the researcher seeks the most fundamental, core meanings of a phenomenon, its essential characteristics, via imaginatively varying elements of the phenomenon to ascertain under what conditions it remains identifiable. This is to identify and draw out the “essences” - those elements which are, for the researcher, necessary for the phenomenon to be that particular phenomenon. Such “essences” may of course differ widely between individuals and between cultures.

Thermoception and thermoregulation are the phenomena that we examine in this article. One of phenomenology’s important contributions is its challenge to mind-body dualism, and its positing of a fundamental mind-body-world nexus; such interconnectedness emerges strongly in our own physical-cultural experiences, as detailed below, and also those of other physical cultures, for example in long-distance swimming (Throsby 2013).

Husserlian descriptive phenomenology (Husserl 1989) is firmly grounded in philosophy, but more applied, empirical forms of phenomenology (Hockey and Allen-Collinson 2007, Allen-Collinson 2009, Martínková and Parry 2011) have subsequently evolved, including cultural phenomenology, sociological phenomenology or phenomenological sociology, and of course phenomenological forms of ethnography (Katz and Csordas 2003), as also delineated in this journal (e.g. Honer and Hitzler 2015, vom Lehn and Hitzler 2015). In the United States, the pragmatist work of Dewey (1980 [1934]), provided a phenomenologically-contoured focus upon describing the sensory basis of habituated action and people’s relationship with their immediate environment (1980, 237). Schütz (1967) linked aspects of Husserl’s later and unfinished work (1970

[1954]), particularly on lived experience and the concept of the *Lebenswelt* or lifeworld (the intersubjectively produced world of immediate, pre-analytical, pre-theoretical experience), with Weberian interpretive sociology, to create phenomenological sociology. Our own work draws on this tradition (e.g. Allen-Collinson 2009 2011 2012, Allen-Collinson and Owton 2015) to investigate aesthetic experiences and somatic ways of knowing as socially constituted, framed and experienced.

Within physical-cultural embodiment, periods of heightened bodily awareness can occur, which we term "intense embodiment experiences" (Allen-Collinson and Owton 2015). These are somewhat analogous to Leder's (1990) phenomenologically-inspired conceptualization of the "dys-appearing body"; a body brought forcibly to conscious attention when pain, discomfort, illness, or other intense feelings remind us of its presence. Our formulation of intense embodiment similarly involves this (sometimes abrupt) conscious awareness of the body and corporeal processes, including very positive and pleasurable sensations – "eu-appearance" in Zeiler's (2010) terms. Intense embodiment connotes a heightened sense of corporeal "aliveness", often with the senses working at intense levels (Allen-Collinson and Owton 2015). Thermoception can, as portrayed in the findings below, generate such feelings of intensity and vitality.

Thermoception

Cultural anthropologists have long noted the different and sometimes nuanced conceptualizations of the sensorium and of specific senses, which prevail cross-culturally (and we would add, temporally). Beyond the "classic five" senses of much European thought, other senses are already familiar to many employing a more "carnal" form of sociology (Crossley 2001). Kinaesthesia, balance, and proprioception, as "inner senses" (Paterson 2007), together with nociception (pain perception) and mechanoreception (pressure perception) are just some of the wider senses examined by researchers from a range of social-scientific perspectives. The portrayal of thermoception as a distinctive sense is perhaps less familiar. For some sociologists/anthropologists, thermoception has been framed as a specific component of touch, for example in the finely gauged temperature of water in marathon swimmers (Throsby 2013), whilst for others (e.g.

Classen 2005, Ong 2012, Allen-Collinson and Owton 2015) it has been theorised as a distinct sense. Potter (2008), for example, posits that touch is a proximal sense requiring actual bodily contact whereas heat is perceived both inside the body and at its boundaries. We concur, and highlight in our findings how we encounter thermoception, and heat perception particularly, as a sense of energy and life-force within our sporting lifeworlds.

The research projects

Although there are differences between the physical-cultural worlds in which data collection was undertaken, here we focus upon the wide range of similarities, as have emerged in discussions between us as researchers. These commonalities include long periods of (often) isolated training, highly disciplined training regimes, a high likelihood of incurring injury and pain due to sustained training practices, and the importance of the sensory dimension in training and competing. As contextualization for the analysis, we provide below brief biographical sketches as relevant to the auto/ethnographic contexts, together with the methods employed in constructing our phenomenologically-based auto/ethnographic or "autophenomenographic" accounts. Readers will doubtless be familiar with the methodology of auto/ethnography (Allen-Collinson 2013, Holman Jones *et al.* 2013; see in particular the special edition of this journal 2006, which includes extensive discussions of different forms of auto/ethnography ranging from analytic to more evocative forms). Here, we note the divider "/" to signal, commensurate with Reed-Danahay's (1997, 2) original writings on this approach, that it combines ethnographies of our own (physical-cultural) social groups with autobiographical writings that are of wider ethnographic relevance. The forms of auto/ethnography utilised in our projects are situated more toward the analytic end of the analytic-evocative continuum. In addition, autophenomenography is an automethodology where researchers draw on phenomenological principles such as *epochē* to identify and reflexively explore core structures or patterns of their experiences of a *phenomenon* (see Allen-Collinson 2009 2011, Allen-Collinson and Hockey 2011, Allen-Collinson and Owton 2015, for further details and empirical examples). Below, we present short physical-cultural

autobiographical pen-portraits, to allow the reader to situate and contextualise the thermoceptive data that follow.

A – Mixed Martial Artist

I am a 33-year old, able-bodied, white, female of Finnish origin, from a working-class background. I have been involved in a range of competitive and recreational sports since childhood, and physical culture has always been an integral part of my life. I was however, a relative latecomer into combat sports in my early 20s, when I began training in Kick- and Muay Thai boxing. During the final year of my undergraduate degree I was introduced to Mixed Martial Arts (MMA), which I have continued to practise alongside more traditional martial arts, namely Wing Chun Kung Fu. I have sustained a commitment to a training regime of 5-7 days a week, frequently training twice a day. My engagement with stand-up, ground and clinching training for MMA involves sustained effort and commitment to developing embodied, skilled ways of knowing MMA at a non-competitive level. Recently, I have had to reduce my training volume due to a serious knee (ACL)³ injury and subsequent surgery. Currently, in addition to combat sports, I train and compete in triathlon at non-elite, age group category level.

My research interest in MMA stems from my doctoral research into varieties of embodied knowing in MMA; an ethnographic examination, using the phenomenological insights of Merleau-Ponty (2001) to investigate the processes of developing embodied, socially-situated and sensuous knowledge. This ethnographic work has also contributed to my research on interconnections between embodied knowledge, visual culture and new media technologies in MMA (Vaittinen 2014). The data, from which my analytic auto/ethnographic findings are drawn, include detailed, reflexive field journals and general field-notes collected during 12 months of ethnographic participant observation. Specifically for the current project, data were also collected via detailed training logs and analytical notes exploring experiences of thermoception during MMA training practice.

³ Anterior cruciate ligament

G – Traditionalist Chinese Martial Artist

I am a 32-year-old, white, middle-class, able-bodied male originally from South-West England. My physical-cultural background is chiefly in classical Asian martial arts, particularly, TMCA. I began training with Taekwondo at 14, and subsequently took up Wing Chun Kung Fu at 15; an art I continue to practise. I have also experimented with other martial arts, studying Judo, Kendo, kickboxing, Taijiquan and Xilam⁴ to varied extents, all influencing my training methods and exercise repertoire. My research interests in Wing Chun derive from an earlier ethnographic study (Jennings et al., 2010), which later extended to an examination of the relationships between TMCA and health (Jennings 2014) and the ecological philosophy of a specific Taijiquan organization (Jennings et al. 2014).

I taught and practised Wing Chun in Scotland for one year, and resided in Mexico from 2011 to 2015, where I started to develop my own martial arts training-system as a vehicle for health and wellbeing. I have adopted an 'internal' perspective on Wing Chun through my focus on standing postures, forms and slow-motion, meditative practice, alongside relaxation and sensitivity training. Many of these concepts and methods closely connect to phenomenology, such as focusing on bodily phenomena accompanied by efforts to suspend a (social)scientific understanding.

The data presented here follow earlier auto/ethnographical and reflexive work on embodied dialogue and encounters between martial arts practitioners and research participants (Jennings 2013), and are based on over a year's intensive training in basic Wing Chun exercises, including standing in difficult stances for up to one hour without visible movement. Traditional written field-notes have now made way for oral recorded commentary in my work, both *in situ* and post-training, in settings ranging from cramped, stuffy, university offices, to a roof-garden.

H – Boxing-woman

⁴ Xilam is a modern Mexican martial art inspired by pre-Hispanic culture and warrior philosophies

Commencing martial arts in childhood, as a white, middle-class, able-bodied woman, I pursued a career competing nationally and internationally for Great Britain until the age of 25. Since retiring from national and international competition, and now in my mid-30s, I have been involved in a range of sports and activities, including basketball, running, cycling and triathlons, also experimenting with Jujitsu and Capoeira. I too have suffered with painful knee problems, and participation in any sports or activities from 2010-2012 was sporadic due to back problems. In 2012, I began training in boxing as part of an auto/ethnographic research project. Since 2012, I have trained 3-4 times a week with the aim of becoming a fully-fledged member of a boxing gym. Whilst my involvement in earlier martial arts was as an amateur athlete, my involvement with boxing is best described as “serious leisure” (Stebbins 2001). I have also recently trained for “wild running” events, involving a combination of off-road running: trails and obstacle runs across outdoor terrain through woodland, lakes and thick mud.

The boxing project was an auto/ethnographic and autophenomenographic project based in two small, urban gyms in England. I maintained a detailed training/research log, and findings from this project have focused on the gendered aspects (Owton 2015) and also on experiences of temperature and “intense embodiment” (Allen-Collinson and Owton 2015). As someone with Raynaud's (sometimes termed “white finger”)⁵ since the age of 11, “temperature work” (Allen-Collinson and Owton 2015) forms a significant and habituated component of my body work, particularly when training outdoors. My memories of school sports involve swinging my arms around in an attempt to get blood moving back into “white fingers”.

J – Running-woman

As a “late starter” in the running scene, I am a white-British woman of working-class origins, and commenced my running “career” (in symbolic interactionist terms) relatively late - in my mid-20s - and my academic career even later. I have been a distance runner

⁵ Raynaud's is a condition affecting the blood supply to certain part of the body, most usually the fingers and toes.

for over 30 years, sustaining a commitment to training, sometimes 6-7 days a week, and twice daily in earlier years. In more recent times, now in my mid-50s, suffering from long-term knee problems and an arthritic foot, mileage and challenging terrain have had to be reduced. Commensurate with Bale's (2004) analysis of running as *work* rather than "fun", my running is routinized and disciplined. This coheres with Howe and Morris' (2009, 314) description of the running "taskscape" that demands frequent, routinized and disciplined training, in order to produce a running-body. Mirroring Stebbins' (2001) concept of "serious leisure", my running requires substantial, sustained personal effort, extensive knowledge, commitment and training.

The running projects from which my auto/ethnographic and autophenomenographic findings are drawn were, respectively: 1) a collaborative auto/ethnography; and 2) an autophenomenographic study of women's distance-running. For the collaborative auto/ethnography, undertaken with a co-runner/co-researcher⁶, data were collected over a two-year period from the initial incurrence of relatively long-term injuries, through repeated, often frustrated, efforts at rehabilitation, and eventually a return to running fitness. We used individual training/injury research logs to record data, together with an analytic log of analytical and conceptual themes. For the second project, an autophenomenographic study of distance-running training in public places, data were collected via the same means. Data analysis for both projects was primarily undertaken via thematic analysis and in the autophenomenographic study I brought into play the phenomenological *epochē* by rendering problematic my taken-for-granted assumptions regarding women's distance running (for specific details, see Allen-Collinson 2011).

Having outlined the nature of our research projects, we now portray some of the salient findings relating to the lived experience of temperature in each of our physical-cultural lifeworlds. We focus on four domains: Elemental touch, Heat of the action, Standing still, and Tuning in, to analyse particular facets of temperature work. Data

⁶ My co-researcher granted permission to include data from this project in the current article.

extracts are taken from fieldnotes and other forms of recording described in the pen portraits.

Elemental touch in running

As noted above, thermoception has been framed in sociological and anthropological literature both as a distinct sense, and as a component of the sense of touch. Some lived-body experiences are indeed redolent of the tactility of thermoception, where the body is literally touched by the elements and other environmental conditions, such as, in my physical-cultural world, icy rain upon naked flesh, or the stinging slap of hot tarmac against thinly-cushioned running-shoe soles. Just as Merleau-Ponty (2001) portrays the intertwining of mind-body-world in his notion of *chiasm* (signified by the Greek χ), our bodies are fundamentally linked to and merged with the elemental world. This mind-body-world nexus is a central structure of much physical-cultural experience. Throsby (2013), for example, a marathon swimmer, evocatively recounts the sensations and pleasures of “oneness” with open water. As runners, we often experience a sense of “oneness” and “folding into” the landscape, the terrain, and a whole gamut of elements, struggling forward against vicious, cutting winds, being pelted by stinging icy rain, cooled by fat warm drops of summer rain, breathing and taking into ourselves the atmosphere and the elements, as highlighted in a fieldnote:

Cold wet run tonight as heavy sleet, snow and rain made for a drenching cocktail. A week's snow has been washed into slurry by the heavy rain, making for that strange double-layered surface when newly thawed snow mixes with mud and shifts and slides atop of still frozen ground - treacherous to run on, even though welcome after the compacted ice-packed pavements...

Slip sliding over the sodden grass, I opt for the firmness of the rough track through the river meadows as the January night descends. Sleets pelts my frozen cheeks so I pull my ski mask higher, but it's already drenched with wet flakes of sodden snow. I seem to be breathing in slushy snow particles...

Picking my way carefully around potholes and puddles, I leap straight into an

unseen one - cursing, then a moment's anticipation before the near freezing water seeps into my trainers and through two layers of socks and then begins slowly, slowly to warm as I squelch my way home through the pinging sleet.

The temperature-touch of the elements can engender unpredictability, or in the philosopher, Heidegger's (1978) term, "thrown-ness", requiring runners to react swiftly, making bodily adjustments on (and also over) the ground. In contrast, more deliberate use and application of heat and cold are undertaken, for example, when seeking out specific conditions in which to train. Thus, runners undertake hot-weather training in order to build up a specific form of heat-endurance (see Hockey and Allen-Collinson 2015) to race effectively in high-temperature locations. Heat/cold-seeking is also undertaken in relation to another, all-too-common occurrence for those who run regularly and often: injury. This may be an acute injury, or more chronic, for example, J's arthritic toe, painfully exacerbated by running on hard and/or hot pavements, and so giving rise to the "dys-appearance" (Leder 1990) of toe and foot:

Hot dusty hard-whack of a run tonight... The heat spikes up in painful shards from the un-giving pavements, and even the softer ground of the common has dried out and compacted to provide little respite to aching legs and sore feet. My feet were swollen by the end of a long working day, I could feel the pinch as I pulled on trainers and had to loosen the laces to squeeze in reluctant feet. Stumble up the hill again at the end of a heat-shortened run, poor old toe and right foot stinging, burning. I try to put feet down evenly, not to "move away" from the painful one. Later, with right leg propped on the coffee table, the carefully applied ice-bag seems to melt against the angry-red, pulsing heat of the injured toe. Then gradually, gratefully, the toe begins to calm as the soothing blue-cool absorbs its fury...

This deliberate seeking out and employment of forms of heat or cold for their therapeutic use becomes part of distance runners' self-help (Hockey 2005b) craft practices, as reflected in the analytic log:

... examining our research logs and previous training logs, it's obvious we have learnt over the years various techniques to treat both chronic and acute problems. Most of the time that has been by trial and error... So for example, putting a damp flannel around a hot water bottle and applying it to a dodgy hamstring repeatedly throughout the day... Or, when applying ice to stop swelling and inflammation, learning how to avoid ice-burns.

Above, we have explored the theorization of thermoception as a form of "touch", for example, of the elements and of heat and cold upon the body. In contrast, we now introduce thermoceptive experiences of inner heat, and "body burn" as encountered in the world of Mixed Martial Arts (MMA).

Heat of the action – MMA

For MMA practitioners and coaches, "getting stuck in to the heat of the action", provides the training ground for development of embodied ways of knowing. Our bodies are the fleshy instruments of comprehension, and together with sensory perception, mediate our relation to the world (Crossley 2001, Jackson 1996, Merleau-Ponty 2001). For A, sensations of hot and cold emerged as integral to the journey of developing embodied understanding and knowledge as a recreational MMA practitioner. Through endless hours of embodied engagement in MMA practices, these sensations become imbued with specific meanings, which may differ substantially from those who are not socialized into this particular physical culture:

Towards the end of the stand-up sparring... arms feel like jelly from grappling, the impact of the takedowns and the perpetual movement from the ground to upright and back again. The bell to signal the end of the round can't come

around quick enough. I gasp for air and suck it in through my nose to get my focus back before the bell goes again. Here we go! The muscles in my thighs are *burning* as I go for a takedown that ends up in a clinch, my movement has slowed down, arms are burning up and my guard drops, bang! A right hook hits me. 'Keep your hands up!' a voice screams inside my head. I keep going. The sensation of the burn, the exertion, makes me so acutely aware of the internal processes that are taking place in my muscles, lactic acid building up and the burn of it from your body trying to break it down.

During training, these sensations of inner heat facilitate the development of an embodied awareness of specific levels of exertion as practitioners gradually learn to regulate their efforts through the education of a refined sense of thermoception. Bodily movement, via a series of intricate contractions, generates heat, as the whole body is recruited into action. During practice, it does not take long for the practitioners to become hot and sweaty. Furthermore, for A, "feeling the burn" of exertion, and the "buckets of sweat" shed over a course of training sessions, are integral components of the intense feeling of vitality (see, Allen-Collinson and Owton 2015) that draws her to MMA.

The development of bodily know-how for MMA involves the skilled education of the senses, learning to feel, see, hear in specific, and sometimes highly nuanced ways – and thermoception is no exception to this refined sensory attunement (see also Allen-Collinson and Owton 2014):

Kick-punch combinations today, really working on improving the spin on my round kicks, the heat soon builds up on the ball of my front foot, giving me the sensory feedback that I'm spinning sufficiently to power the kicks...

Attuning the sense of thermoception enables the continuous development of and adjustment to the process of developing skilled movement capacities for action, of which the above provides a key example.

These lived experiences and thermoceptive sensations were also highly pertinent to experiences of sporting injury, in providing a form of corporeal “yardstick” or barometer during A’s return to training following complete ACL reconstruction surgery. The sensations of heat were experienced as perceptually distinct from the pain suffered during a long period of time post-surgery and during rehabilitation. If the session were too intense, A could sense the feeling of warmth, and a hot throbbing sensation spread across the afflicted knee, often manifesting in swelling post-session. Gradually through trial and error, a better and more nuanced understanding began to develop regarding how best to practise with the injured knee and the appropriate “heat intensities” within the bounds of which it was necessary to remain. Sometimes, however, things did not go to plan and A frequently had to resort to a range of remedial practices:

I am still struggling to keep the swelling down on my operated knee, although the scars have now healed, activity still causes it to swell up. The area around the knee is still hot to touch and I can sense the nagging throb that still accompanies me after training sessions. I reach for the freezer and grab the ice pack, wrapping it in a towel. I apply the ice at 10 minute intervals, and the sensation of heat and throbbing begins to subside, and thankfully, so does the swelling.

In the analysis of MMA, we have considered temperature work as driven by corporeal movement, together with socialization into “reading” of sensory feedback. In contrast, in the next section, we examine lived heat as generated by *not* moving, in “standing training” in TCMA.

Standing still, doing a lot – TCMA

TMCAs constitute a myriad of systems and styles developed over centuries in China. Many forms, such as Taijiquan and Wing Chun, have changed their ideologies and discourses through a reimagined history (Judkins and Nielsen 2015), but “standing training” unites all TMCAs. Here, G analyses interoceptive feelings of intense embodiment and intense heat generated by standing still. This form of training differs

to the sweaty, energetic warm-up routines of Kung Fu (Jennings *et al.* 2010). G spent over a year learning how to stand for long periods in different stances. The intrinsic experience of standing in quite uncomfortable positions produced new sensations, and the following extract describes one prolonged session of standing-still that generated heat and sweat akin to those of a hard circuit-training session:

My hand tingling is now joined by a sensation of warmth and tickling down through my forearm to the elbow pit. I am surprised to note a small puddle of sweat that marks where my left foot had been. It gleams against the bright office light, and I feel my sock slightly damp, yet cool. There is no puddle or mark from the right foot, although my footmarks are beginning to form on the floor.

The meditation-in-stillness is a form of self-cultivation outlined by Yuasa (1993), a Japanese philosopher influenced by the works of Merleau-Ponty. Despite his knowledge of scientific, esoteric and other competing health and body philosophies (Jennings 2015), G tries to remove all previous conceptions of body heat from his mind in a form of phenomenological *epochē*. Instead, his attunement follows what Nagatomo (1992) terms “attunement through the body” – the concentration on one action or even on a single digits or joint:

It is the first session back after my short holiday; my punches feel weak and slow, and hunger from lack of a hearty breakfast hampers my efforts with chain (multiple) punches. During the warm-up (slow-motion) strikes, I sense a higher degree of warmth across the tendons and ligaments around the elbow joints. Nevertheless, running through the first form of Wing Chun, I realise that I miss training, especially the buzzing, warm sensation through my fingers. Another thing I notice right now is that I have more lines on my hands; there are small lines across the backs of my fingers – vertical, rather than horizontal. The sweat forms in the larger lines, moving along like cracks.

As the investigation continued, G experimented with a range of stances and movements including solo forms, which incited tremendous skin heat:

Shirtless, with sufficient environmental heat, I practise some fundamental techniques and positions in the training stance. A few days' beard holds a moustache of sweat above my top lip. It makes me feel uncomfortable, and I want to wash my face, and even shave – but I lack the basic toiletries. My mouth feels itchy and sticky, as if I had spilt a soda on my face!

The next day, I detect a moustache of sweat forming across the canal of my upper lip. It slowly spreads along that exact region of my face, until I work on specific hand techniques that, rather paradoxically, cooled me down.

Muscular contraction creates heat, and in standing training, contractions of the back muscles, legs, "core", bicep and shoulder stabilizers, are isometric. This is undertaken in an effort to circumvent pain and injuries (see also, Spencer 2012), and constitute the very foundation of technique-training. Nevertheless, some muscular pain, primarily in the thighs, prevented G from continuing his stance-holding. This pain and heat were not those of combat (see Green 2011), produced intercorporeally, but rather were self-induced, involving the gradual somatic learning of how to stand still and how to gauge at what point the detected build-up of heat signaled the need to come out of the stance:

I felt sick this morning, and after taking some medicine and an aspirin, I rested for a while at the university. Now, I am able to stand for about 40 minutes in Siu Lim Tao [posture]. The heat across my chest and forehead soon becomes unbearable, and I have to limp out of the stance. Some walking exercises quickly loosen off my stiff limbs, and I feel warmth in my feet – particularly the left one. Shortly afterwards, my palms and fingers tingle with heat, and I glance at them – they are full of a reddish hue, with small patches of white.

The above instances strongly resonate with our theorization of heat as a specific and distinct sense, interoceptively detected, lived and evaluated. In the final section, we return to the focus on the mind-body-world intertwining highlighted in “elemental touch”, but also consider some of the challenges of thermoregulation and temperature work encountered in H’s boxing-training, when simultaneous heat/cold experiences can produce corporeal confusion.

Tuning in - boxing

Over years of training, H’s continued engagement in somatic, body-focusing work has assisted in the development of self-understanding and fine attunement (Allen-Collinson and Owton 2014) to potential and actual bodily problems, such as muscle twinges that can signal the onset of something more serious. H has been socialized through engagement with a range of different physical cultures into the application of heat and cold. Here, she highlights the rapid cooling and microtrauma-restricting action of ice, which she has learnt how to apply to best effect in efforts to prevent “niggles” turning into more serious injury:

I’m getting much more in tune with my body so when I feel something niggle nowadays, I don’t ignore it, I ice it straight away and it does wonders!

H’s thermoceptive encounters can, however, sometimes be unpredictable, and experienced as a sense of extremely changeable and fluctuating energy levels. Here, a field note testifies to how she experiences battling against the elements during running-training for boxing:

Running along the sea front today felt hard – the cold wind was so strong and I feel the resistance against my body as I constantly push against it... I feel it in my chest, like it’s blowing against me and as I breathe, I feel the

force of the wind blowing into me. But as I turn and make my way back I suddenly feel the wind behind me; as I run with it, it disappears in some way. I don't have to fight, to struggle, to run against resistance, but neither does the wind blow me along... I just run, freely, without pushing against the added pressure. I can get back to finding my rhythm, notice my breathing and feel myself sweating, whereas before I didn't notice that, all I noticed was the "pushing against".

In phenomenologically-oriented terms, H's body is engaged in both an outward projection to the world and an interoceptive focus, a fluctuating, shifting intentionality from pushing against the wind to "a falling back", into consciousness of visceral depths (Leder 1990). H became more acutely aware of her breathing, in ways that linked the physiological, the psychological *and* the environment (see also Hockey and Allen-Collinson 2007). Interestingly, for H, it is primarily *after* (rather than during) training when conscious awareness of sensory and thermoceptive problems "kicks in":

My feet are freezing but I'm sweating – sometimes my body shuts down when I'm buzzing and just so immersed in something else. After training, I see two fingers are bright white and suddenly I find myself shivering. I realise that my body's been shutting down. Quickly, I have to try and get warm before it gets worse but it's harder to warm up again especially after I've finished training so I have to try and be somewhere warm.

Here, H highlights how her intentionality, her attentional focus, is directed toward the activity in which she is engaged in the moment; she is "buzzing" and "immersed" in the boxing training, so that awareness of herself as a body-in-the-world recedes. Her body "disappears" in Leder's (1990) terms. Only post-training does thermoceptive awareness return, and she then engages in temperature work, identifying that her body is cold and requires urgent re-heating.

Thermoception can also be a confusing experience, for example, when H's body overall is experienced as hot and sweating, but specific parts simultaneously feel cold and numb, for example in this field note written after intense training:

Tabata⁷ training was tough and it got me back into the swing of sweating quickly which was great! During press ups on the third circuit, I felt my chest, arms and wrists give way... it's like I felt a hard heat in my shoulders which stiffened me and slowed me down, stopping me from carrying on. But I pushed through and collapsed at the very end, feeling the cool floor on my face for a split second before I drag myself up and gasp some water down me... feeling relief as the very light coolness soars down my windpipe. The temptation is to curl over in exhaustion, but I know that stretching out the chest and letting the air reach the depths of my lungs helps recovery better... Also, if my body shuts down, the Raynaud's will take over, which is harder to get rid of. Even so the coach teases me about my "blue lips" and I really felt myself gasping for breaths a lot tonight.

For H, this coldness creeps up "out of the blue", giving rise to sudden "thrownness" into numb coldness through the body, so that her intentionality is again urgently directed towards warming the body. In temporal contrast, such corporeal warming takes a long time. In the above instance, H's felt inability to undertake corrective temperature work and re-assert some degree of control over the heat felt in parts of her body, leaves her feeling vulnerable.

Discussion and concluding reflections

Vannini and Taggart (2014) have noted the dearth of ethnographic investigation of lived heat/cold, despite the centrality of temperature perception and control across all cultures. To address this lacuna, here we have examined via a phenomenological-

⁷ The Tabata method is an intense form of exercise using sets of short intervals

sociological lens how temperature is actually experienced and handled within our specific physical cultures, which demonstrated considerable similarities. As can be ascertained from the data extracts included above, we found that thermoception can indeed be conceptualized as a distinct sense within our various physical cultures, rather than being “lived” as a specific modality of touch. Whilst the tactility of thermoception did emerge, for example, when our bodies were literally *touched* by the elements and environment, other forms of thermoception were not amenable to such conceptualization, but were experienced more interoceptively, as an intense form of inner heat or energy. Furthermore, several key findings emerged from all four projects, when analysed *in toto*. We discuss below two of these in particular, as reflected in the above data: 1) the valorization of sweat and sweating; and 2) the importance of thermoceptive somatic learning and temperature work.

First, we consider the appreciation, valorization – even celebration – of sweat and sweating that emerged as a strong element across all our different auto/ethnographic contexts. In a fascinating sociological analyses of smell and the olfactory in everyday life, Low (2006) examines in depth the “social violation” wrought by body odors, including those emanating from sweat. He evocatively describes (2006, 617) how social actors who emit bodily odors are perceived as committing both odoriferous and social defilement and therefore induce social rejection. From a social geography perspective, Waitt (2014) highlights the different cultural, social and spatially-specific connotations of sweat and sweating bodies. Of direct relevance to our conceptualization of intense embodiment, his analysis reveals that visceral experiences of the materialities of sweat and sweatiness often give rise to a heightened sense of bodily awareness and self in the course of everyday life. The social context is identified as key in both Low’s (2006) and Waitt’s (2014) work. In relation to gym and sports cultures, for example, Waitt (2014, 669) argues that sweat in some ways becomes “clothed in respectability” through discourses of improving rather than “polluting” bodies. Here, the physical hard labour of “working-up a sweat” is viewed as personal care, and coded as transformative, producing a healthier, fitter, slimmer, tauter body.

Across all four of the current research projects, sweat was found to represent corporeal immersion in the hard physical labour of engaging in our respective physical cultures, of willingness and preparedness to put in the hard gruelling work of training. As contextually-appropriate, working-up a sweat thus brings with it strong moral connotations, of not shirking hard work, of enduring sometimes intense thermoceptive bodily discomforts (Hockey and Allen-Collinson 2016). In relation to the three women researchers, too, there is a further gendered dimension. Being visibly (and olfactorily) sweating and sweaty, makes a strong statement that we are not unduly concerned about the aesthetic and social interactional consequences of being hot, sticky, sweaty, pungent, and dishevelled women, including when training in public places. Such visible and olfactory parading of a heavily sweating female body is largely antithetical to received norms of femininity in contemporary Western societies.

A further common element evident from the research projects was the importance of somatic learning and socialization into bodily ways of knowing, interpreting and sense-making with regard to temperature, in short “temperature work” (Allen-Collinson and Owton 2015). As Vannini and Taggart (2014) posit, drawing on Ingold (2011), thermoception can be understood as an interface, a skill, and a hub of activities. Temperature work, involving learning the skills of thermoception and thermoregulation, learning to live with, and to endure, levels of temperature-related discomfort and “dys-ease” (Leder, 1990), to perceive and identify even small changes in temperature, appears to have physical-culturally-specific components.

Whilst we may consider as exceptional the Tibetan Buddhist monks who learn to be able to control their metabolic rate and thus temperature, in everyday embodiment we are often called upon to engage in temperature work, interpreting and making meaning of temperature, and constantly seeking to achieve and sustain a balance of hot/cold as contextually-contoured. Such work is required not only in order to accomplish specific tasks, but also importantly in physical cultures, to avoid or reduce the risk of incurring injury and/or illness. Furthermore, and commensurate with our phenomenologically-sensitive approach, the mind-body-temperature nexus is salient, for not only do we learn through socialization and immersion in the training practices of

our physical cultures to feel, interpret and make sense of temperature, but these training practices are, in Throsby's (2013) words, "sensorially transformative". Sustained engagement with our training practices over time induces thermoceptive corporeal changes that alter and shape how temperature is experienced and "felt" in the body. Just as Throsby's (2013) marathon swimmers learnt to assess water temperature very precisely, and Hockey and Allen-Collinson's (2016) endurance runners learnt to assess energy levels to a fine degree, in our respective physical cultures, we developed a fine and refined attunement to temperature. Such attunement was actively employed in our decision-making, for example, in relation to what course of action to pursue: to come out of a sustained standing stance to avoid pulling a muscle, to apply ice to cool the heat of an arthritic toe, to avoid a bodily "niggle" developing into injury, or to allow a post-operative knee to heal more swiftly.

Here we have portrayed certain forms of temperature work, but there may well be myriad others, shaped by the different cultures and subcultures we inhabit. They may also be highly context-dependent, shifting over place and time, as we develop new somatic ways of knowing. There thus remains a need for detailed auto/ethnographic investigation into the under-researched sense of thermoception and the capacity for thermoregulation, without both of which we would, quite simply, die.

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